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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/595,841 | JOHNSON, WARREN THOMAS | |
| | Examiner | Art Unit | |
| | Denise R. Anderson | 1774 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *21 January 2011*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) *23-33* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☒ Claim(s) *1-33* are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *15 May 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

## DETAILED ACTION

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

### Claim Rejections - 35 USC § 102

2. Claims 1-12, 14, and 17-22 are rejected under 35 U.S.C. 102(b) as being anticipated by Cote el. (US Patent No. 5,607,593, Mar. 4, 1997).

3. Table 1 below keys the claimed apparatus structure to that of the prior art. The claims appear next in italics, with the underlined terms keyed to the prior art in Table 1. After each claim or set of claims, the patentability analysis follows in normal font.

| Table 1: Keying claimed apparatus structure with that of the prior art. | |
|---|---|
| **Claimed Apparatus Structure** | **Prior Art Structure -- Cote et al.** |
| **Membrane module.** Fig. 1, membrane filtration module 5.<br>**Membranes.** Fig. 1, membranes 6.<br>**Upper header.** Fig. 1, upper header 7.<br>**Upper collection chamber.** Fig. 1, upper filtrate collection chamber.<br>**Lower header.** Fig. 1, lower header 8.<br>**Lower collection chamber.** Fig. 1, lower filtrate collection chamber 11. | **Membrane module.** Figs. 1-11, filtration modules 31.<br>**Membrane.** Figs. 1-11, membranes 3.<br>**Upper header.** Figs. 6 and 9-11 where it is shown that membranes (membranes 3) extend between upper and lower headers.<br>**Upper collection chamber.** Fig. 10 and 11, above upper header discussed above.<br>**Lower header.** Figs. 6 and 9-11 where it is shown that membranes (membranes 3) extend between upper and lower headers.<br>**Lower collection chamber.** Figs. 5, 6, and 9, base 32. |
| **Aeration/backwash device** – Fig. 1, aeration / backwash device 16.<br>**Communication chamber.** Fig. 3, communication chamber 17.<br>**Through-openings.** Fig. 1, through-openings 18, 19.<br>**Upper through-openings.** Fig. 1, through-openings 18.<br>**Lower through-openings.** Fig. 1, through-openings 19. | **Second type of aeration/backwash device, second embodiment -- which is closest to applicant's embodiment shown in figures.** Fig. 9, annular structure at the bottom of the membrane module 31 where the communication chamber is underneath the hood, with the gas through-openings shown at the ends of the ozone supply means 15 and the liquid and gas through-openings shown as lower open-worked zone 8.<br>**Communication chamber.** Fig. 9, annular structure at the bottom of the membrane module 31 where the communication chamber is underneath the hood.<br>**Through-openings**. The gas through-openings shown at the ends of the ozone supply means 15 and the liquid and gas through-openings shown as lower open-worked zone 8. |

<table>
<tr><td></td><td>Upper through-openings. The gas through-openings shown at the ends of the ozone supply means 15.<br>Lower through-openings. The liquid and gas through-openings shown as lower open-worked zone 8.<br><br>Second type of aeration/backwash device, first embodiment. Fig. 6, where the communication chamber is within the tube where the ozone (O3) is introduced by ozone injection means 6. The through-openings are the holes in the tube through which the ozone is introduced.<br>Communication chamber. Within the tube, as stated directly above.<br>Through-openings. The tube holes, as stated directly above.<br>Upper through-openings. Upper tube holes.<br>Lower through-openings. Lower tube holes.<br><br>Second type of aeration/backwash device, third embodiment. Fig. 10, where the communication chamber is within the porous structure 16 where the ozone (O3) is introduced. The through-openings are the holes in the porous structure 16 through which the ozone is introduced and the holes through the structure holding membranes 3.<br>Communication chamber. Within the porous structure 16, as stated directly above.<br>Through-openings. The porous structure 16 holes and the holes through the structure holding membranes 3.<br>Upper through-openings. Holes through structure holding membranes 3.<br>Lower through-openings. Holes in porous structure 16.<br><br>First type of aeration/backwash device. In Figs. 1, 7, and 8 of Cote et al. discloses there is wall 9 through which air from the air compressor 19 or permeate from backwashing pump 18, or both, are delivered from the permeate recovery chamber 10 into the membrane modules 3 via the openings in the hollow fibers housed in sheaths 5. Cote et al., Figs. 1, 7, and 8, col. 10, lines 1-19. In this case, applicant's aeration/backwash devices would be the Cote et al. hollow fibers with the recited communication chamber being the hollow center of the hollow fibers and the recited through-openings that gas and liquid pass through being the hollow fiber pores.<br>Communication chamber. Hollow center of the hollow fibers, as stated directly above.<br>Through-openings. Pores of hollow fibers, as stated directly above.<br>Upper through-openings. Upper pores of hollow fibers.<br>Lower through-openings. Lower pores of hollow fibers.</td></tr>
<tr><td>Vessel. Fig. 4, vessel 25.</td><td>Vessel. Figs. 1-4, 7, 8, and 11, reactor 1.</td></tr>
</table>

4. Claim 1 follows.

Claim 1. (currently amended) An aeration/backwash device for use with a porous membrane filtration (membrane) module comprising

one or more membranes having opposing potted ends, each of the one or more membranes having a permeable wall which, in use, is subjected to a filtration operation wherein feed containing contaminant matter is applied to one side of the (membrane) wall and filtrate is withdrawn from the other side of the membrane wall,

the aeration/backwash device adapted to at least partially surround a portion of said membrane module and including

a communication chamber having spaced through-openings in fluid communication with said (communication) chamber and the membrane module,

wherein, in use, gas is supplied to the (communication) chamber and communicated to the membrane module through the through-openings in a direction substantially perpendicular to a longitudinal axis of said membranes to provide a substantially even cross flow gas distribution for aerating the membranes within the membrane module and

liquid backwash is withdrawn from and/or fed into the membrane module through said through-openings into said (communication) chamber.

5. Regarding claim 1, Cote et al. discloses aeration / backwash devices in a water-treatment installation with one or more membranes (membranes 3) vertically spaced between upper and lower headers. Cote et al., Abstract, line 1; Figs. 1, 3, and 5-11 showing membranes 3; Figs. 5, 6, and 9-11 showing membranes 3 with potted opposing ends. There are two types of Cote et al.

aeration / backwash devices. First, there is a wall 9 through which air from the air compressor 19 or permeate from backwashing pump 18, or both, are delivered from permeate recovery chamber 10 into the membrane modules 3 via the openings in the hollow fibers housed in sheaths 5. Cote et al., Figs. 1, 7, and 8; col. 10, lines 1-19. In this case, applicant's aeration / backwash devices would be the Cote et al. hollow fibers with the recited communication chamber being the hollow center of the hollow fibers and the recited through-openings that gas and liquid pass through being the hollow fiber pores.

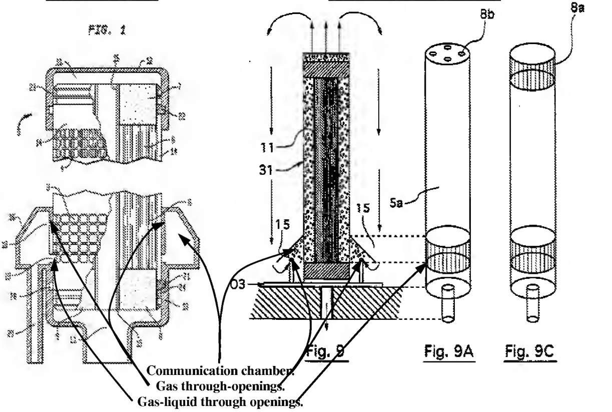
6. The one remaining claim 1 limitation is taught by the second type of Cote et al. aeration / backwash device. Cote et al. discloses such devices in Figs. 1, 2 and 5-11 as ozone (or O3) injection means 6 connected to an ozone supply network 15 "to serve as both a circulation fluid and an oxidizing fluid." Cote et al., col. 3, lines 27-28. Cote et al. further teaches, "The ozone could therefore be introduced into the installation according to the following three modes of implementation: in a gaseous monophase form . . . in a biphase form . . . in an aqueous monophase form." Cote et al., col. 4, lines 33-44; Fig. 1 where the ozone is introduced as a gas, Fig. 7 where the ozone is introduced as a gas with water, and Fig. 8 where the ozone is introduced in saturated water form. Cote et al. further discloses three embodiments of the ozone injection means that correspond to the recited aeration/backwash device with a communication chamber and spaced through-openings for the introduction of gas or liquid. First, there is the tube shown in Fig. 6 where the ozone (O3) is introduced by ozone injection means 6. Second, there is the annular structure shown in Fig. 9 at the bottom of the membrane module 31 where the chamber is underneath the hood, with the small through-openings shown at the ends of the

ozone supply means 15 and the large through-openings shown as lower open-worked zone 8. Third, there is porous structure 16 through which ozone (O3) is introduced as shown in Fig. 10.

7. The second embodiment shown in Fig. 9 is an example of applicant's recited "aeration/backwash device [that] is adapted to at least partially surround a portion of said membrane module" and "gas is supplied . . . through said through-openings in a direction substantially perpendicular to a longitudinal axis of said membranes to provide cross flow gas distribution for aerating the membranes." Cote et al., col. 12, lines 4-12. This Cote et al. embodiment of the aeration/backwash device is shown below, along-side of applicant's claimed structure.

**Specification, Fig. 1, Membrane Module Compared to Cote et al. Membrane Module in Figs. 9, 9A, & 9C**

**Specification, Fig. 1** **Cote et al., Figs. 9, 9A, and 9C**



8. In the Fig. 9 embodiment of the aeration/backwash device, Cote et al. discloses small through-openings shown at the ends of the ozone supply means 15 and large through-openings shown as lower open-worked zone 8. Cote et al., Fig. 9. Referring to Figs. 9, 9a, 9b, and 9c, Cote et al. further teaches that the gas is supplied through the small through-openings "by pipes positioned essentially perpendicularly to the longitudinal axis of the modules (applicant's membrane modules)." Cote et al., col. 12, lines 4-12. This meets the functional limitation that gas is supplied through "the <u>through-openings</u> in a direction substantially perpendicular to a longitudinal axis of said <u>membranes</u> to provide a substantially even cross flow gas distribution for aerating the <u>membranes</u> within the <u>membrane module</u>."

9. In summary, Cote et al. anticipates all claim 1 limitations.

10. As an aside, it does not enter into the patentability analysis whether the liquid backwash provided to the aeration / backwash device is permeate or water to be treated because it has been held that, "Expressions relating the apparatus to contents thereof during an intended operation are of no significance in determining patentability of the apparatus claim." Ex parte Thibault, 164 USPQ 666, 667 (Bd. App. 1969). MPEP 2115 [R-2]. As long as Cotes et al. discloses an apparatus structure to deliver a gas or a liquid through the through-openings of the aeration/ backwash device, the prior art reads on the claim limitation. In this case, Cotes et al. discloses that both gas and liquid can be delivered to the through-openings in the hollow fiber aeration / backwash device and the ozone injection aeration / backwash devices.

11. Claim 2 follows.

Claim 2. (original) An aeration/backwash device according to claim 1 wherein the gas and liquid backwash are selectively communicated through the same through-openings.

12. Cote et al. discloses an aeration/backwash device wherein the gas and liquid backwash are selectively communicated through the same through- openings. In other words, gas and liquid can be introduced "selectively" in time where gas is introduced first and then liquid or vice versa. For hollow fiber aeration / backwash devices, Cote et al. teaches, "The backwashing . . . starts with the permeate present in the chamber 10 . . . and ends by the penetration of air . . . at the end of the backwashing operation." Cote et al., col. 10, lines 9-26; Figs. 1, 7, and 8. For the ozone injection aeration / backwash devices, Cote et al. shows equipment set up to deliver a gas stream through ozone-supply means 22 and an air compressor 19 and liquid through pump 21a in Figs. 7 and 8, such that gas and liquid can be introduced selectively to ozone injection means 6.

13. Claims 3 and 4 follow.

Claim 3. (previously presented) An aeration/backwash device according to claim 1 wherein the through-openings are vertically spaced through-openings in fluid communication with said (communication) chamber and the membrane module, and wherein, in use, gas is supplied to the (communication) chamber and communicated to the membrane module through at least the upper of said through-openings to aerate the membranes within the membrane module and liquid backwash is withdrawn from the membrane module through the lower of said through-openings into said (communication) chamber.

Claim 4. (original) An aeration/backwash device according to claim 3 wherein backwash or feed liquid is fed or injected into the base of the (membrane) module through the lower openings or both set of (through) openings.

14. Claim 3 recites the through-openings are vertically spaced and gas moves "through at least the upper of said through-openings" and liquid "is withdrawn . . . through the lower of said through-openings." Claim 4 recites liquid is fed "into the base of the module through the lower openings or both sets of openings." As was discussed in the claim 1 patentability analysis, Cote et al. discloses the apparatus in place to deliver gas and liquid to the hollow fiber aeration / backwash devices (Figs. 1, 7, and 8) and the ozone injection aeration / backwash devices in (Figs. 7 and 8). Cote et al. further teaches that the hollow fiber aeration / backwash devices have vertically spaced through-openings in the form of pores such that gas moves "through at least the upper of said through-openings" and liquid "is withdrawn . . . through the lower of the through-openings," as recited in claim 3. Cote et al. further teaches, in Figs. 1, 7, and 8, that liquid is fed "into the base of the module through the lower openings or both sets of openings" as recited in claim 4. Cote et al. also discloses vertically spaced through openings in the ozone-injection aeration / backwash device shown in Fig. 9 with small through-holes shown at the ends of the ozone supply means 15 and the large through-holes shown as lower open-worked zones. In Fig. 9, Cote et al. further teaches bubbles 11 and liquid moving "through at least the upper of said through-openings." As was discussed in the claim 1 patentability analysis, Cote et al. also teaches that ozone can be injected as a liquid (Fig. 8 and col. 4, lines 33-34 and 42) through the ozone network supply means 15 shown in Fig. 9. As such, Cote et al. discloses that liquid is fed

"into the base of the module through the lower openings or both sets of openings" as recited in claim 4.

15. Claim 5 follows.

Claim 5. (original) An aeration/backwash device according to claim 4 wherein the backwash and/or feed liquid is used to sweep solids along the membranes to carry out solids backwashed off the membrane surfaces during said aeration.

16. Cote et al. discloses an apparatus in place such that "ozone injection means (applicant's aeration / backwash device) enabl[es] the creation of a current of water within said sheath" and thus discloses a device that can inject liquid "to sweep solids along membranes . . . during aeration," as recited. Cote et al., col. 6, lines 49-50.

17. Claims 6-10 follow.

Claim 6. (previously presented) An aeration/backwash device according to claim 1 wherein the vertically spaced through-openings include an upper and lower set of through-openings.

Claim 7. (previously presented) An aeration/backwash device according to claim 6 wherein the upper (through) openings are smaller in cross-sectional area than the lower (through) openings.

Claim 8. (previously presented) An aeration/backwash device according to claim 6 wherein the (through) openings of each set of through-openings are axially spaced around the periphery of the (communication) chamber.

Claim 9. (previously presented) An aeration/backwash device according to claim 6 wherein the liquid backwash is withdrawn from and/or fed through both sets of through-

openings.

Claim 10. (previously presented) An aeration/backwash device according to claim 1 wherein the (aeration/backwash) device is formed as an annulus.

18. Regarding claims 6-10, Cote et al. discloses an ozone injection aeration / backwash device in Fig. 9 at the bottom of the membrane module 31 and also hollow fiber aeration / backwash devices (fibers enclosed in membrane module 31) with the through-openings being the hollow fiber pores. Both types of devices were discussed in the claim 1 patentability analysis above. As was also discussed in the claim 1 patentability analysis, Cote et al. further teaches that both gas and liquid flow through these devices in Figs. 1, 7, and 8. The Cote et al. ozone injection device in Fig. 9 has small through-holes shown at the ends of the ozone supply means 15 and large through holes shown as lower open-worked zone 8. As such, Cote et al. discloses upper and lower through-openings [claim 6] through which liquid flows [claim 9]. The upper through-openings, i.e., the pores, of the hollow fiber devices are smaller than the lower through-openings of the ozone injection device [claim 7]. Cote et al. also discloses, in the Fig. 9 ozone injection device, through-openings axially displaced around the periphery of the chamber [claim 8] in the form of an annulus [claim 10].

19. To summarize, Cote et al. anticipates all limitations recited in claims 2-10.

20. Regarding claims 11 and 12 – As shown in Table 2 below, independent claim 11 recites claim 1 limitations in a slightly different format. Dependent claim 12 recites claim 3 limitations. As such, the patentability analysis for these limitations is analogous.

| Table 2: Limitations of claims 11 and 12 compared to those discussed above for claims 1 and 3. | |
|---|---|
| **Claims 11 and 12** | **Claims 1 and 3** |
| Claim 11. (currently amended) A porous membrane filtration (membrane) module including | Claim 1. (currently amended) An aeration/backwash device for use with a porous membrane filtration (membrane) module comprising |
| one or more membranes extending longitudinally between vertically spaced upper and lower headers into which the ends of the membranes are potted, the membranes having a permeable wall which, in use, is subjected to a filtration operation wherein feed containing contaminant matter is applied to one side of the membrane wall and filtrate is withdrawn from the other side of the membrane wall,<br>the upper and lower headers being in fluid communication with one or both of the ends of said membranes and at least one associated upper and/or lower filtrate (upper or lower) collection chamber such that,<br>in use, filtrate withdrawn from said other side of the membrane wall is communicated through at least one of the upper and/or lower header to the associated upper and/or lower collection chambers, | one or more membranes having opposing potted ends, each of the one or more membranes having a permeable wall which, in use, is subjected to a filtration operation wherein feed containing contaminant matter is applied to one side of the (membrane) wall and filtrate is withdrawn from the other side of the membrane wall, |
| an aeration/backwash device at least partially surrounding a portion of said membrane module and including<br>a communication chamber having spaced through-openings in fluid communication with said communication chamber and the membrane module,<br>wherein, in use, gas is supplied to the communication chamber and communicated to the membrane module through said through-openings in a direction substantially perpendicular to a longitudinal axis of said membranes to provide a substantially even cross flow gas distribution for aerating the membranes within the membrane module and<br>liquid backwash is withdrawn from and/or fed into the membrane module through said through-openings into said communication chamber. | the aeration/backwash device adapted to at least partially surround a portion of said membrane module and including<br>a communication chamber having spaced through-openings in fluid communication with said (communication) chamber and the membrane module,<br>wherein, in use, gas is supplied to the (communication) chamber and communicated to the membrane module through said the through-openings in a direction substantially perpendicular to a longitudinal axis of said membranes to provide a substantially even cross flow gas distribution for aerating the membranes within the membrane module and<br>liquid backwash is withdrawn from and/or fed into the membrane module through said through-openings into said (communication) chamber. |
| Claim 12. (previously presented) A porous membrane filtration (membrane) module according to claim 11<br><br>wherein the through-openings are vertically spaced through-openings in fluid communication with said (communication) chamber and the membrane module, wherein, in use, gas is supplied to the (communication) chamber and communicated to the membrane module through at least the upper of said through-openings to aerate the membranes within the membrane module and liquid backwash is withdrawn from and/or fed into the | Claim 3. (previously presented) An aeration/backwash device according to claim 1<br><br>wherein the through-openings are vertically spaced through-openings in fluid communication with said (communication) chamber and the membrane module, and wherein, in use, gas is supplied to the (communication) chamber and communicated to the membrane module through at least the upper of said through-openings to aerate the membranes within the membrane module and liquid backwash is withdrawn |

| | |
|---|---|
| membrane module through the lower of said through-openings into said (communication) chamber. | from the membrane module through the lower of said through-openings into said (communication) chamber. |

21. As shown in Table 2, claim 11 recites claim 1 limitation and further recites an upper and lower filtrate collection chamber. Cotes et al. discloses an upper filtrate chamber in Figs. 10 and 11 and a lower filtrate collection chamber (permeate-recovery chamber 10) in Figs. 1 and 6-8. The remaining limitations were addressed above in the patentability analysis of claims 1 and 3.

22. Claim 14 follows.

> Claim 14. (previously presented) A porous membrane filtration (membrane) module according to claim 11 wherein the aeration/backwash device is located adjacent the lower header.

23. Dependent claim 14 recites that the aeration / backwash device is adjacent the lower header. Cote et al. discloses this for the hollow fiber aeration / backwash devices (membranes 3) in Figs. 5, 6, and 9-11. Cote et al. further teaches this for the ozone injection aeration / backwash devices shown in Fig. 6 (the tube where the ozone, O3, is introduced by ozone injection means 6), in Fig. 9 (the annular structure at the bottom of the membrane module 31 where the ozone, O3, is introduced through ozone supply means 15) and Fig. 10 (the porous structure 16 where ozone, O3, is introduced).

24. Claims 17-22 follow.

> Claim 17. (previously presented) A porous membrane filtration (membrane) module according to claim 11 further including a screen which at least partially surrounds said membranes.

Claim 18. (previously presented) A porous membrane filtration (membrane) module according to claim 17 wherein the screen (membrane module) is a sleeve which extends along part of the length of the membranes.

Claim 19. (previously presented) A porous membrane filtration (membrane) module according to claim 17 wherein the screen (of the membrane module) is solid.

Claim 20. (previously presented) A porous membrane filtration (membrane) module according to claim 17 wherein the screen (of the membrane module) is located above said aeration/backwash device.

Claim 21. (previously presented) A porous membrane filtration (membrane) module according to claim 19 wherein the screen (of the membrane module) extends along the full length of the membrane module and is provided with one or more openings adjacent the through-openings of the aeration/backwash device to allow communication with the membranes and one or more additional openings at or adjacent the top of the (membrane) module to allow flow of gas of liquid therethrough.

Claim 22. (previously presented) A porous membrane filtration (membrane) module according to claim 21 having one or more further openings in said screen (of the membrane module) at or adjacent the aeration/backwash device to allow bypass of backwash flow.

25. Dependent claims 17-22 recite various limitations on a screen surrounding the membranes. In Figs. 1-11, Cote et al. discloses a screen (sheath 5) at least partially surrounding the membranes [claim 17] (membranes 3) and at least partially extending along the membrane length [claim 18] in a membrane filtration module (filtration module 31). The Cote et al. screen

(sheath 5) is solid [claim 19] and located above the ozone injection backwash / aeration devices [claim 20] as shown in Fig. 6 (the tube where the ozone, $O_3$, is introduced by ozone injection means 6), in Fig. 9 (the annular structure at the bottom of the membrane module 31 where the ozone, $O_3$, is introduced through ozone supply means 15) and in Fig. 10 (the porous structure 16 where ozone, $O_3$, is introduced). In these same figures, Cote et al. further teaches that the screen (sheath 5) extends the full length of the membrane module (membranes 3 in filtration module 31) with one or more openings (open-worked zones 8) adjacent the aeration / backwash device and additional openings (open-worked zones 8) at the top [claim 21]. Cote et al. also teaches that liquid moves through the screen openings [claim 22], i.e. the sheath holes, when Cote et al. discloses that "said sheaths hav[e] holes that enable the passage of water to be treated in said preferred direction of treatment." Cote et al., col. 3, lines 60-62.

26. To summarize, Cote et al. anticipates all limitations recited in dependent claims 11, 12, 14, and 17-22.

## Claim Rejections - 35 USC § 103

27. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cote el. (US Patent No. 5,607,593, Mar. 4, 1997) as applied to claim 11 above, and further in view of Zha et al., (WO 03/013706 A1, Feb. 20, 2003 – which will be cited from the equivalent US Patent Pub. 2004/0217053 A1) for the filtrate connection pipe.

28. Claim 13 follows.

Claim 13. (previously presented) A porous membrane filtration <u>(membrane) module</u> according to claim 11 wherein a filtrate connection pipe is provided in fluid

communication between the upper and lower filtrate collection chambers and filtrate is withdrawn from one or the other of the (upper or lower) collection chambers.

29. Claim 13 recites a filtrate collection pipe between the upper and lower filtrate collection chambers. Cote et al. discloses the claimed invention except for the filtrate collection pipe. In the Fig. 1 membrane module assembly, Zha et al. teaches that it is known to have a filtrate collection pipe between upper and lower filtrate collection chambers (permeate collection headers 9 and 10). One of ordinary skill in the art at the time the invention was made would have been motivated to include a filtrate collection pipe between the Cote et al. upper and lower filtrate collection chambers as taught by Zha et al., since Zha et al. states at ¶ 30, lines 8-10, that such a modification would allow "[f]iltrate / permeate [to be] removed from both ends of the module 6 through ports 11 and 12 connected to headers 9 and 10 respectively," as opposed to just one end.

30. In summary, Cote el., in view of Zha et al. for the filtrate connection pipe, discloses or suggests all limitations recited in claim 13.

31. Claims 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cote el. (US Patent No. 5,607,593, Mar. 4, 1997) as applied to claim 11 above, in further view of Watanabe et al. (WO 02/04101 A1, Jan. 17, 2002 – which will be cited from the equivalent US Patent Pub. 2004/0045893 A1).

32. Claims 15 and 16 follow.

Claim 15. (previously presented) A porous membrane filtration (membrane) module according to claim 11 wherein the upper and lower collection chambers include

respective upper and lower collection cups adapted to detachably receive and engage in a fluid-tight manner said <u>upper and lower headers</u>.

Claim 16. (previously presented) A porous membrane filtration <u>(membrane) module</u> according to claim 15 wherein the <u>(upper and lower) headers</u> are lockably engaged with the collection cups (of the <u>upper and lower collection chambers</u>) by means of a bayonet-type fitting.

33. Cote et al. discloses the claimed invention except for explicitly stating that the filtration module is detachable [claim 15] from the upper and lower collection chambers. Watanabe et al. teaches that the filtration module is detachable in Figs. 1, 4, 6 and 9-11 for "a hollow fiber membrane cartridge used in a filtration apparatus used for removing turbidity and bacteria from a large volume of raw water." Watanabe et al., ¶ 1, lines 6-8. Referring to Fig. 6, Watanabe et al. further teaches, "The hollow fiber membrane cartridge of the present invention is inserted into the housing from above and fixed to the upper end of the housing head by means of the collar 12a of the cartridge through a gasket or an O-ring so as not to permit the passage of liquid either in or out. . . . The housing head 21b, the collar 12a and the cap 24 are integrally fixed by means of a housing nut 23." Watanabe et al., ¶ 98. One of ordinary skill in the art at the time the invention was made would have been motivated to construct the Cote et al. filtration module to be detachable as taught by Watanabe et al., since Watanabe et al. states at ¶ 98 that such a modification would allow the hollow fiber membrane cartridge to be inserted into the housing (applicant's screen) and then detachably secured there by a fitting so that the liquid to be filtered would not bypass the membranes.

34. Cote et al., in view of Watanabe et al., discloses the claimed invention except for the bayonet-type fitting recited in claim 16. The Watanabe et al. fitting is shown in Figure 9 as a clamp 20 and in Figures 10-11 as a threaded housing nut 23. One of ordinary skill in the art at the time the invention was made would have been able to substitute a bayonet-type fitting for the clamp or threaded housing nut taught by Watanabe et al. because of the equivalence for their use in the fittings art – and the selection of any of these known equivalents to allow the hollow fiber membrane cartridge to first be inserted into the housing (applicant's screen) and then detachably secured there by a fitting so that the liquid to be filtered does not bypass the membranes, would be within the level of ordinary skill in the art.

## Response to Arguments

35. Applicant's arguments filed January 21, 2011 have been fully considered but they are not persuasive.

36. Regarding claim 1, applicant argues, "Claim 1, as amended, sets forth that gas is supplied through the through-openings in a direction substantially perpendicular to a longitudinal axis of the membranes to provide a substantially even cross flow gas distribution for aerating the membranes within the membrane module. Such an arrangement provides for even cross flow gas distribution, which enhances scouring of fiber bundles thus reducing the accumulation of solids and inhibiting the blockage of fibers. This is in contrast to the arrangement shown in Cote." Applicant's Remarks, p. 10, lines 6-12.

37. Applicant further argues, "Cote discloses a distribution network 15 having a pair of upstanding pipes which are spaced apart from the filtration modules 31 and a hood arrangement

(see Fig. 9). It can be clearly seen that the upstanding pipes in Cote et al. are oriented in a position parallel to the fiber bundles (see Fig. 9). The ozone emitted by the pipes initially travels in a direction parallel to the longitudinal axis of the modules and is then guided towards the fiber bundles by an angled hood. In this arrangement, the gas is not directed in an orientation which is perpendicular to the fiber bundles. Therefore, the arrangement in Cote does not provide cross flow gas distribution relative to the fibers as in the current invention. In addition, Cote cannot provide a substantially even gas distribution because its through-holes in the lower open worked zone 8 are elongated, eliminating the possibility of an even cross flow of gas." Applicant's Remarks, p. 10, lines 12-22. Applicant makes a similar argument regarding claim 11. Applicant's Remarks, p. 11, lines 7-12 and 18-25.

38. The limitations under discussion follow.

Claim 1. (currently amended) An <u>aeration/backwash device</u> for use with a porous membrane filtration <u>(membrane) module</u> comprising . . .

wherein, in use, gas is supplied to the <u>(communication) chamber</u> and communicated to the <u>membrane module</u> through said the <u>through-openings</u> in a direction substantially perpendicular to a longitudinal axis of said <u>membranes</u> to provide a substantially even cross flow gas distribution for aerating the <u>membranes</u> within the <u>membrane module</u> . . .

Claim 11. (currently amended) A porous membrane filtration <u>(membrane) module</u> including . . . an <u>aeration/backwash device</u> . . .

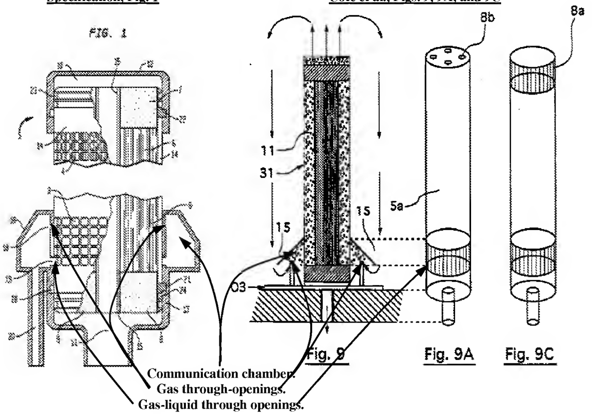
wherein, in use, gas is supplied to the <u>communication chamber</u> and communicated to the <u>membrane module</u> through said <u>through-openings</u> in a direction substantially

perpendicular to a longitudinal axis of said membranes to provide a substantially even cross flow gas distribution for aerating the membranes within the membrane module . . .

39. The examiner responds as in the above patentability analysis. Applicant's claimed invention is shown alongside of the prior art.

**Specification, Fig. 1, Membrane Module Compared to Cote et al. Membrane Module in Figs. 9, 9A, & 9C**

**Specification, Fig. 1** **Cote et al., Figs. 9, 9A, and 9C**




In the Fig. 9 embodiment of the aeration/backwash device, Cote et al. discloses small through-openings shown at the ends of the ozone supply means 15 and large through-openings shown as lower open-worked zone 8. Referring to Figs. 9, 9a, 9b, and 9c, Cote et al. further teaches that the gas is supplied through the small through-openings "by pipes positioned essentially

perpendicularly to the longitudinal axis of the modules (applicant's membrane modules)." Cote et al., col. 12, lines 4-12. As such, Cote et al. meets the functional limitation that gas is supplied through "the through-openings in a direction substantially perpendicular to a longitudinal axis of said membranes to provide a substantially even cross flow gas distribution for aerating the membranes within the membrane module."

40. Applicant argues that a pair of upstanding pipes with small through-openings directed into larger, elongated through-openings cannot provide an even cross flow gas distribution. The examiner maintains that Cote et al. teaches the pipes are "positioned essentially perpendicularly to the longitudinal axis of the modules." Cote et al., col. 12, lines 4-12. As long as the pipes are arranged symmetrically around the membrane module, whether it is two or more pipes does not enter into the patentability analysis of the functional limitation. As long as the through-openings exist, whether they are elongated or not does not enter into the patentability analysis of the functional limitation.

41. Applicant argues the functional limitation of even cross flow gas distribution provides the apparatus with enhanced scouring. Claims 1 and 11 are rejected under 35 U.S.C. 102(b). According to MPEP 2131.04, "Evidence of secondary considerations, such as unexpected results or commercial success, is irrelevant to 35 U.S.C. 102 rejections and thus cannot overcome a rejection so based. In re Wiggins, 488 F.2d 538, 543, 179 USPQ 421, 425 (CCPA 1973)."

## Conclusion

42. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

43. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

44. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Denise R. Anderson whose telephone number is (571)270-3166. The examiner can normally be reached on Monday through Thursday, from 8:00 am to 6:00 pm.

45. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Walter D. Griffin can be reached on 571-272-1447. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

46. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR

system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/DRA/

/Walter D. Griffin/
Supervisory Patent Examiner, Art Unit 1774